

**What is claimed is:**

1        1. A read head for use with an interconnect transmission line having a  
2 characteristic impedance of  $Z_0$ , the read head comprising:

3              a tunnel valve device, the tunnel valve device having a device resistance  
4  $R_T$  corresponding to a predetermined resistance-area (RA) product; and

5              a shunt resistance  $R_S$  connected in parallel across the tunnel valve device,  
6 a value of the shunt resistance being based on the parallel combination of  $R_T$  and  $R_S$   
7 substantially equaling a predetermined selected value of resistance.

1        2. The read head according to claim 1, wherein the predetermined selected  
2 value of resistance substantially equaling the characteristic impedance  $Z_0$  of the  
3 interconnect transmission line.

1        3. The read head according to claim 1, wherein the predetermined resistance-  
2 area (RA) product is about equal to at least about 10 Ohms- $\mu\text{m}^2$ .

1        4. The read head according to claim 1, wherein the predetermined resistance-  
2 area (RA) product is about equal to a value of a resistance-area (RA) product in which a  
3 Tunnel Magneto-Resistance (TMR) ratio  $\Delta R/R_0$  for the tunnel valve device does not  
4 substantially increase for further increase in the value of the resistance-area (RA)  
5 product.

1        5. The read head according to claim 1, wherein the shunt resistance  $R_S$  is  
2 located on a substrate/slider for the read head.

1        6. The read head according to claim 1, wherein the shunt resistance  $R_S$  is  
2 located at an arm electronics module associated with the read head.

1        7. A disk drive, comprising:  
2              an interconnect transmission line having a characteristic impedance of  $Z_0$ ;  
3              and

4                   a read head having a tunnel valve device and a shunt resistance  $R_S$ , the  
5   tunnel valve device having a device resistance  $R_T$  corresponding to a predetermined  
6   resistance-area (RA) product; the shunt resistance  $R_S$  being connected in parallel across  
7   the tunnel valve device, and a value of the shunt resistance being based on the parallel  
8   combination of  $R_T$  and  $R_S$  substantially equaling a predetermined selected value of  
9   resistance.

1                 8.   The disk drive according to claim 7, wherein the predetermined selected  
2   value of resistance substantially equaling the characteristic impedance  $Z_0$  of the  
3   interconnect transmission line.

1                 9.   The disk drive according to claim 7, wherein the predetermined resistance-  
2   area (RA) product is about equal to at least about 10 Ohms- $\mu\text{m}^2$ .

1                 10.   The disk drive according to claim 7, wherein the predetermined resistance-  
2   area (RA) product is about equal to a value of a resistance-area (RA) product in which a  
3   Tunnel Magneto-Resistance (TMR) ratio  $\Delta R/R_0$  for the tunnel valve device does not  
4   substantially increase for further increase in the value of the resistance-area (RA)  
5   product.

1                 11.   The disk drive according to claim 7, wherein the shunt resistance  $R_S$  is  
2   located on a substrate/slider for the read head.

1                 12.   The disk drive according to claim 7, wherein the shunt resistance  $R_S$  is  
2   located at an arm electronics module associated with the read head.